

ABSTRACT

[0061] A surface-transformation method of forming regions of a second material in a first solid material to control the properties of the first solid material is disclosed. The regions of the second material are formed in the first solid material by drilling holes to a predefined depth and at a predefined lattice position. The holes in the first solid material are then filled with a second material and then the first and second materials are heated to a temperature close to the melting point of the first solid material to spontaneously form the regions filled with the second material and embedded in the first solid material at the desired location. A liquid-phase immersion method or a deposition method may be employed to fill the holes in the first solid material.